

## Study Illuminates the 'Pain' of Social Rejection

ScienceDaily (Mar. 30, 2011) — Physical pain and intense feelings of social rejection "hurt" in the same way, a new study shows.

The study demonstrates that the same regions of the brain that become active in response to painful sensory experiences are activated during intense experiences of social rejection.

"These results give new meaning to the idea that social rejection 'hurts'," said University of Michigan social psychologist Ethan Kross, lead author of the article published in the *Proceedings of the National Academy of Sciences*. "On the surface, spilling a hot cup of coffee on yourself and thinking about how rejected you feel when you look at the picture of a person that you recently experienced an unwanted break-up with may seem to elicit very different types of pain.

"But this research shows that they may be even more similar than initially thought."

Kross, an assistant professor at the U-M Department of Psychology and faculty associate at the U-M Institute for Social Research (ISR), conducted the study with U-M colleague Marc Berman, Columbia University's Walter Mischel and Edward Smith, also affiliated with the New York State Psychiatric Institute, and with Tor Wager of the University of Colorado, Boulder.

While earlier research has shown that the same brain regions support the emotionally distressing feelings that accompany the experience of both physical pain and social rejection, the current study is the first known to establish that there is neural overlap between both of these experiences in brain regions that become active when people experience painful sensations in their body.

These regions are the secondary somatosensory cortex and the dorsal posterior insula.

For the study, the researchers recruited 40 people who experienced an unwanted romantic break-up within the past six months, and who indicated that thinking about their break-up experience led them to feel intensely rejected. Each participant completed two tasks in the study -- one related to their feelings



*New research shows that physical pain and intense feelings of social rejection "hurt" in the same way. (Credit: iStockphoto/Photo\_Concepts)*

of rejection and the other to sensations of physical pain.

During the rejection task, participants viewed either a photo of their ex-partner and thought about how they felt during their break-up experience or they viewed a photo of a friend and thought about a recent positive experience they had with that person. During the physical pain task, a thermal stimulation device was attached to participants left forearm. On some trials the probe delivered a painful but tolerable stimulation akin to holding a very hot cup of coffee. On other trials it delivered non-painful, warm stimulation.

Participants performed all tasks while undergoing functional magnetic resonance imaging (fMRI) scans. The researchers conducted a series of analyses of the fMRI scans, focusing on the whole brain and on various regions of interest identified in earlier studies of physical pain. They also compared the study's results to a database of more than 500 previous fMRI studies of brain responses to physical pain, emotion, working memory, attention switching, long-term memory and interference resolution.

"We found that powerfully inducing feelings of social rejection activate regions of the brain that are involved in physical pain sensation, which are rarely activated in neuroimaging studies of emotion," Kross said. "These findings are consistent with the idea that the experience of social rejection, or social loss more generally, may represent a distinct emotional experience that is uniquely associated with physical pain."

The team that performed the research hopes that the findings will offer new insight into how the experience of intense social loss may lead to various physical pain symptoms and disorders. And they point out that the findings affirm the wisdom of cultures around the world that use the same language -- words like "hurt" and "pain" -- to describe the experience of both physical pain and social rejection.

The study was funded by the National Institute of Mental Health and by the National Institute on Drug Abuse and performed at Columbia University.

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#### Journal Reference:

1. Ethan Kross, Marc G. Berman, Walter Mischel, Edward E. Smith, Tor D. Wager. **Social rejection shares somatosensory representations with physical pain.** *Proceedings of the National Academy of Sciences*, 2011; DOI: [10.1073/pnas.1102693108](#)

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